Overwintering Recovery of Introduced Cotton Aphid Parasites

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The cotton aphid, *Aphis gossypii* Glover (Homoptera: Aphididae), can attain pest status in a variety of crops in the San Joaquin Valley. A cooperative biological control project among the United States Department of Agriculture, Agricultural Research Service (USDA-ARS), the California Department of Food and Agriculture (CDFA) Biological Control Program, University of California Cooperative Extension, and the University of Arkansas was initiated in 1996. The long-term objective of this project was to construct a natural enemy complex using natural enemies not currently found in California to complement the existing natural enemy complex of the cotton aphid. Two parasite species, *Aphelinus* near *paramali* (ANP) and *Aphelinus gossypii* Timberlake (AG) (Hymenoptera: Aphelinidae), have been identified as useful in the initial construction of the introduced natural enemy complex. Distribution of these two parasite species throughout the San Joaquin Valley began in 2000.

In 2002, 10 nursery sites were maintained. The nursery sites were located as close as possible to the 10 nursery sites used in 2000 and 2001. One site was in Merced County, three in Madera County, and six in Kern County. The Merced County site did not have cotton, but was maintained because overwintering by ANP had occurred there for two years. Most of the sites have a variety of habitats that are favorable for the cotton aphid throughout the year. Beginning in early July, aphid populations were sampled by examining 40 to 80 cotton plants within each site for the presence of aphids. As soon as cotton aphids were found at a site, parasite releases began and continued until cotton was harvested. During 2002, a total of 17,700 ANP and 109,850 AG were released in the nursery sites. Weekly sampling to determine if the parasites were using the cotton aphids began two weeks after the first release. Any aphids or mummies recovered from the sampling were returned to the laboratory and held for parasite emergence. The sampling of sites continued until two weeks after cotton harvest, when sampling shifted to four-to-six week intervals sampling of adjacent areas that might harbor cotton aphid.

From samples collected in the winter and early spring (2001/2002), ANP was recovered at the Merced nursery (three adults) in February, and from a Kern nursery in April (two adults). Recovery of ANP in both nurseries occurred before any 2002 releases of ANP, and therefore represents overwintering by ANP. This is the second year of overwintering recoveries of ANP from the Merced nursery site, and the first year for the same Kern nursery. At the garden site maintained at Shafter Research and Extension Center, AG was recovered in February. This recovery represents overwintering by AG. At another Kern nursery, an intact black mummy was recovered in April, prior to the release of any parasites. The adult within this mummy failed to emerge, so its identity is not known. In May, AG was recovered after a release was made in the nursery. Therefore, AG is known to overwinter at only one site in Kern County.

Black mummies, indicative of the released parasites, were recovered at eight of the 10 nursery sites. More parasites were recovered from the nursery sites in Kern County. The nursery sites in Merced and Madera Counties had very few aphids throughout the entire cotton season. At one other Kern nursery sites; black mummies were recovered in November on Shepard's purse, suggesting that the parasites moved from the aphids on cotton to those on surrounding weeds.

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